

# Polyurethane Stent Obstruction as a Cause of Recurrent Epiphora Case Report

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## Summary

*A Song's nasolacrimal duct stent was placed in a patient with epiphora due to primary nasolacrimal duct obstruction and the stent was kept for 32 months. Mitomycin C 0.02% eye drops four times a day were prescribed for four weeks following polyurethane stent placement procedure. No epiphora-related complaints occurred for thirty months after then the epiphora started. Nasolacrimal stent was removed from nasal cavity endoscopically and the tissues within the extruded stent were examined histopathologically. The patient's complaints were relieved following stent removal. Dacryocystogram revealed normal passage and a filling defect within the lacrimal sac. Macroscopic evaluation of the stent revealed a firm mass in the stent mushroom, causing complete obstruction. Pathological examination of the mass revealed chronic inflammation, increased connective tissue and vascular proliferation.*

*Nasolacrimal polyurethane stents can be removed easily by nasal approach. Nasolacrimal passage may be left open temporarily after stent removal. The use of Mitomycin C drop is a novel approach in nasolacrimal stent placement cases. However, when the long-term results of endoscopic and external dacryocystorhinostomy are considered, further research is needed on the biocompatibility of stent material.*

## Introduction

The obstruction of the lacrimal sac or nasolacrimal duct generally result from chronic dacryocystitis. The lacrimal duct system obstructions may lead to excessive tearing known as epiphora. External dacryocystorhinostomy (DCR) is accepted as the gold standard for treating lower lacrimal duct obstruction. Also, endoscopic DCR is a frequently practiced surgical technique with success rates of 90% or higher if performed by an experienced surgeon<sup>1</sup>.

Polyurethane stent placement into the nasolacrimal canal was first performed in the treatment of obstructive epiphora by Song et al<sup>2</sup>. The method is less successful than external and endoscopic DCR in long term period<sup>1,3,4</sup>. The most important factor in failure is the obstruction of stent due to foreign material reactions.

In order to increase the success rates in stent placement, we prescribed mitomycin C 0.02% eye drops four times a day for four weeks after polyurethane stent placement procedure. The follow-up of five patients to whom mitomycin C drops were prescribed after polyurethane stent placement are yet continuing. Stent obstruction developed in one of these patients presented in present manuscript at the postoperative 32<sup>nd</sup> month. It was intended to report our approach to the case and to examine the removed stent histopathologically.

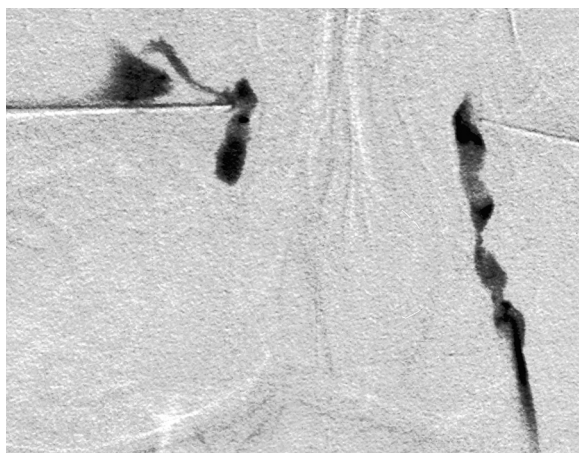


Figure 1 Dacryocystogram of prior to stent placement. (the right lacrimal sac is filled but there is no passage to the nasolacrimal canal)

### Case Report

Eighteen-year-old female patient had applied to our outpatient clinic complaining of epiphora and undergone dacryocystogram indicating obstructive epiphora. Right nasolacrimal duct obstruction was detected during dacryocystogram (Figure 1). A Song nasolacrimal duct stent was placed into the nasolacrimal duct (Figure 2). The stent was placed according to the technique described by Song et Al<sup>2</sup>. In addition, mitomycin C 0.02% eye drops four times a day were prescribed for four weeks postoperatively. The patient had no complaints for 30 months. She reapplied to our clinic com-

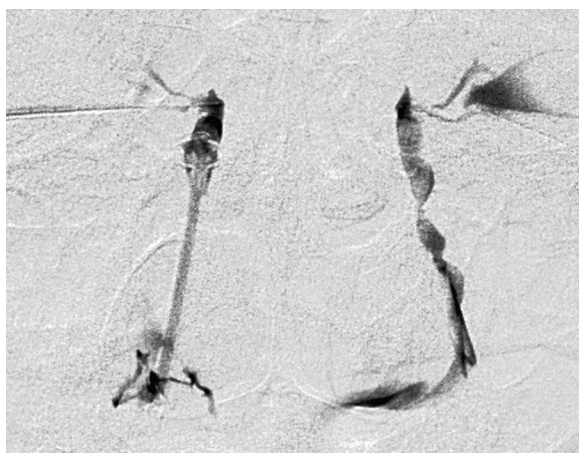


Figure 2 Dacryocystogram following polyurethane stent placement (open nasolacrimal passage).

plained epiphora in the 32<sup>th</sup> month of stent placement procedure.

Nasolacrimal irrigation revealed that there was no passage through the nasolacrimal system. During the nasal endoscopic examination, the stent was found to be in proper position in the inferior meatus. The polyurethane stent was removed from nasal cavity under endoscopic view without any difficulty or resistance by pulling the lower end of the stent with a forceps.

Dacryocystogram showed a filling defect within the lacrimal sac and the open passage following stent removal (Figure 3). As a result the patient's complaints of epiphora were relieved.

Macroscopic examination of the polyurethane stent removed from the nasolacrimal canal revealed that there was no proliferation on the external surface of the stent. The upper end of the stent placed into the sac was covered with a hard tissue (Figure 4). The stent was cut and the tissue within the lumen was examined histopathologically. The tissue within the upper end was extending downwards through the lumen. Histopathological diagnosis of the sample was chronic inflammation, increased connective tissue and vascular proliferation (Figure 5).

There was a considerable reduction in the epiphora-related complaints of our patient in the 1<sup>st</sup> month following stent removal. However epiphora started in the second month following stent removal. Nasolacrimal canal lavage showed negative results. For that reason the patient was directed to endoscopic DCR and silicon tube intubation.

### Discussion

External and endoscopic DCR operations performed traditionally in the surgical treatment of obstructive epiphora are invasive methods and regarded as the gold standards. However, there is considerable ongoing research to develop non-invasive methods such as polyurethane stent placement into the nasolacrimal duct.

Even though favorable results are obtained initially with polyurethane stents in selected cases with both nasolacrimal duct obstruction and normal lacrimal sac sizes, the success rates decrease in the long term. Unlike the routine clinical applications, we prescribed mitomycin C 0.02% eye drops four times a day for four weeks to our cases in order to increase the long-term success of nasolacrimal polyurethane

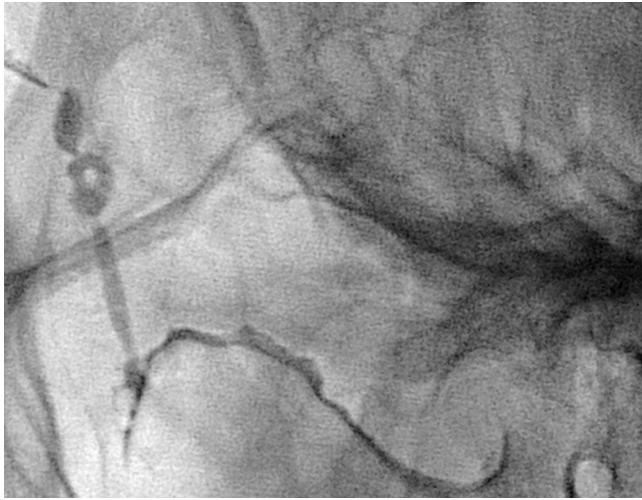


Figure 3 Open nasolacrimal passage with filling defect within nasolacrimal sac after stent removal.



Figure 4 Polyurethane stent after removal from the nasolacrimal canal (a fibrotic tissue obstructing the lumen at the upper end of the stent).

stent placement. Our purpose in applying mitomycin C drops following nasolacrimal stent placement was to benefit from the antiproliferative and antifibroblastic effects of this drug.

Yazıcı et Al reported 82% success rates in a mean follow-up duration of 7.2 months, whereas Song et Al reported 79% success rates in the early period in their polyurethane stent applications<sup>5,6</sup>. However, these success rates progressively decrease in longer term as Yazıcı et al have reported 69% success rates in a mean follow-up duration of 23 months<sup>7</sup>. Öztürk et Al reported that their success rates in stent-placed cases were 60.4%, 37.5% and 31.2% in the 6<sup>th</sup>, 12<sup>th</sup> and 18<sup>th</sup> follow-up months, respectively<sup>8</sup>, whereas these rates were stated as 66.6%, 55.5%, 50% and 50% in the 1<sup>st</sup> week, 6<sup>th</sup> month, 1<sup>st</sup> year and 2<sup>nd</sup> year of follow-up, respectively, by Ulrich et Al<sup>9</sup>. Additionally, 5-year primary latency reported by Kang et Al was only 5.3%<sup>4</sup>. These results clearly show that the success rates progressively decrease in the long term. The cause of failure in the long term in these cases is the obstruction of stents with fibrovascular granulation tissue due to foreign material reactions. Likewise, the stent in our case was obstructed in the 32<sup>nd</sup> month despite the application of mitomycin C 0.02 % drops.

Nasal endoscopic examination showed that the stent was properly located in the inferior meatus and its lower end was patent. So, external DCR operation, silicon tube intubation and stent removal during the surgery were considered. Instead, nasolacrimal stent was removed during nasal endoscopy without any difficulty. Yazıcı et Al reported difficulties in stent removal due to extreme adhesions and the fibrosis and granulomatous reactions in the nasolacrimal canal and sac<sup>10</sup>, whereas we removed

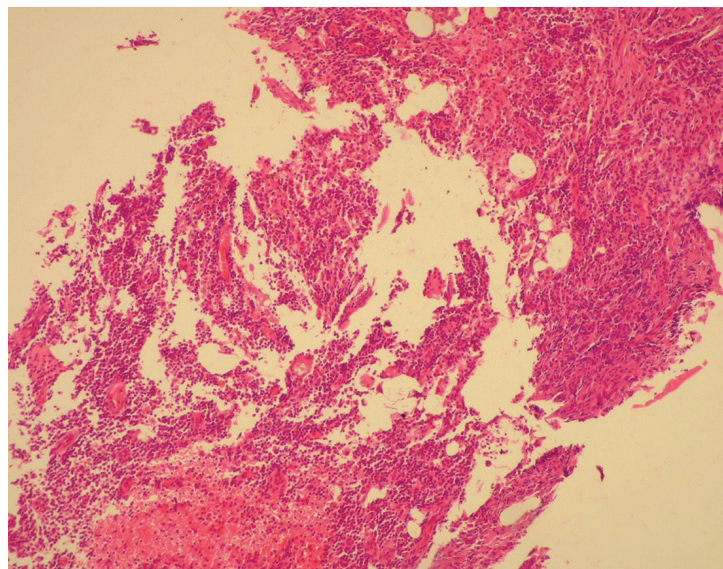


Figure 5 Histopathological appearance of the tissue within the polyurethane stent (Hematoxyline-Eosin staining reveals chronic inflammation, increased connective tissue and vascular proliferation) (Hematoxyline-Eosin X 40).

the stent without any significant difficulty or complication. The reason can be explained by postoperative application of mitomycin C. In addition, Song et Al reported that the obstructed stents could be removed by nasal approach<sup>11</sup>.

Paul et Al reported that they had temporarily placed nasolacrimal polyurethane stents in nine cases, and lacrimal system reobstruction occurred in each patient within two months after the stents removal<sup>14</sup>. However, passage patency following stent removal was demonstrated in some studies<sup>4,11-13</sup>. Lacrimal system reobstruction occurred within a month following the stent removal in our case. Therefore, we concluded to perform endoscopic DCR and silicone tube intubation to the patient.

During the endoscopic DCR operation; the lacrimal sac lumen was found to be significantly narrowed and fragile, and also invaded by fibrotic granulation tissue. This observation explains the preoperative filling defect within the lacrimal sac seen during dacryocystogram. Kang et al have reported that some alterations in the lacrimal sac configuration may occur with the removal of stent<sup>4</sup>. Yazıcı et Al have re-

ported that external DCR operations should be preferred in cases of stent obstruction<sup>10</sup>. The reasons for preferring endoscopic DCR to external DCR in this specific case were preoperatively removal of the stent within the nasolacrimal canal by nasal approach and the aesthetically unfavorable results of external DCR such as leaving scars.

We propose that topical mitomycin C applications may be a novel approach to increase long term success rates with polyurethane nasolacrimal stent placement. However, the obstruction observed within 32 months, despite the application of mitomycin C reduced our optimism.

Considering the long-term outcomes of endoscopic and external DCR, we can conclude that further research should be conducted on the biocompatibility of materials used in stent applications.

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